Natural Products Insider

Muscle-building takeaways

Muscle nutrition rightfully has focused on protein, but many supportive ingredients have emerged to help boost the overall muscle-building process.

Steve Myers | Jul 19, 2019

Muscles are comprised of proteins. Certain exercise damages muscles, and the body uses amino acids from protein to repair and form new muscle fibers, a process called muscle protein synthesis (MPS).

A growing focus is on the mammalian target of rapamycin (mTOR) pathway for triggering MPS. Branched chain amino acids (BCAAs) are thought to activate mTOR, with leucine touted as the primary factor.

Whey protein, a dairy product, is a staple in muscle building, as it contains sufficient amounts of all the essential amino acids, including leucine. Developments to improve the bioavailability of whey include ioWhey from Plasma Nutrition, which was designed to optimize the molecular structure of whey to improve absorption. Other innovations aim to boost the MPS effects of whey protein/BCAAS, including Velositol, a complex of amylopectin and chromium—insulin is thought to impact MPS, and chromium helps regulate insulin.

For dairy proteins, blending different types (e.g., whey, casein and milk proteins in isolate or concentrate forms) can help smooth out texture challenges. Texture and stability can be concerns in certain formats, including bars and ready-to-drink (RTD) beverages, and blending can help here as well. Flavors and sweeteners are used to improve protein taste profiles.

Plant proteins are rising stars, even in the core sports nutrition consumer group. However, many plants are missing or low in key amino acids, so formulators need to consider amino acids profiles and the potential of blending multiple plant sources.

Plant proteins often come with distinctive tastes and textures. For instance, pea protein can impart an earthy, grassy or beany aftertaste and gritty texture. Masking agents, while expensive, can be a godsend for plant protein formulation. Some companies, like Synergy Flavors, are researching the compounds in plants responsible for taste and aroma, then developing targeted solutions. Solubility can also be a challenge for plant proteins in beverage formulations.

Phosphatidic acid and testosterone may also be crucial to triggering MPS. Gencor developed a specially selected strain of fenugreek to boost testosterone levels and anabolic activity.

Some anabolic ingredients are risky for athletes subject to drug testing. Myostatin is a protein that inhibits muscle growth, making compounds that inhibit myostatin desirable to consumers seeking bigger, stronger muscles. The World Anti-Doping Agency (WADA) prohibits myostatin inhibitors generally and has specifically

banned follistatin, which is sourced form fertilized eggs, for use in sports nutrition. A range of “natural” ingredients have been shown to inhibit myostatin, including compounds in green tea, cocoa, cauliflower, broccoli, magnolia, apple peel and holy basil. Questions as to where WADA will draw the line on myostatin inhibitors remain unanswered.

Numerous ingredients can promote muscle building by addressing the metabolic impacts in muscle and boosting muscle recovery. Creatine is crucial to muscle bioenergetics and beta alanine helps reduce muscle fatigue, fueling longer, more intense exercise.

Metabolic processes in the muscle also include oxidation of carbs and fats. The carotenoid astaxanthin is among the antioxidant ingredients shown to manage oxidative stress to promote muscle growth and strength.

Improving blood flow to muscles delivers more oxygen and nutrients to muscles to drive exercise and recovery adaptations. In the body, nitric oxide (NO) relaxes blood vessels (vasodilation) to increase flow. Arginine is a precursor to NO and thus has been a common ingredient in blood-flow-boosting formulas, but bioavailability concerns and mixed study results have steered the industry to novel forms, including arginine-alpha-ketoglutarate (AAKG) and inositol-stabilized arginine silicate, as well as other precursors such as citrulline. Adding peptides to either seems to boost results.

Many other ingredients studied for increasing NO levels and/or blood flow and assorted biomarkers include nitrate-rich beetroot and spinach, as well as polyphenolic-rich fruits and plants. However, the research is far from definitive for most of these ingredients, so formulators may struggle to compile adequate substantiation for blood flow claims.

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